VERMONT
AGENCY OF TRANSPORTATION

FACT SHEET

2019 Research Showcase & STIC Annual Meeting

Environmental Impacts of Polymer Modified Roadways

PROJECT TITLE
Environmental Impacts of Polymer Modified Roadways

STUDY TIMELINE
May 2019 – Present

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This fact sheet was prepared for the 2019 VTrans Research Showcase & STIC Annual Meeting held at the Dill Building in Berlin, VT, on September 11, 2019 from 8:30 am– 1:00 pm.

Fact sheets can be found for additional projects featured at the 2019 Symposium at http://vtrans.vermont.gov/planning/research/2019showcase

Additional information about the VTrans Research Program can be found at http://vtrans.vermont.gov/planning/research

Additional information about the VTrans STIC Program can be found at http://vtrans.vermont.gov/boards-councils/stic

Introduction or Problem Statement

211,152 tons of Municipal Solid Waste (MSW) was generated in Vermont in 2016, 36% of which was recycled. With the statewide goal of increasing MWS diversion rates to 50% by 2022, innovative solutions will need to be formulated. During Vermont's Green up day in 2018, 200 to 300 tons of trash was collected along 13,087 miles of roadway. This is equivalent to every mile of road having an estimated 35 pounds of trash or 4.5 pounds of plastic annually. Polymer modified roadways may potentially benefit the Universal Recycling Law Act 148 to achieve MSW diversion rates.

Methodology or Action Taken

Six recycled plastics (PET, HDPE, PVC, LDPE, PP & PS) underwent various laboratory exposure conditions (Temperature, pH, Salinity and UV) to simulate colder region climates. Samples were measured for pH and salinity every seven days through five weeks exposure time. Literature research was done in-between laboratory testing periods.

Conclusions or Next Steps

The plastics did not show any sign of significant deterioration from the varying acidity, salinity, temperature, and UV radiation conditions. The measurements were more related to the exposure condition rather than the plastic type. The salinity increased by ~37% while the pH decreases ~3%. The next step for laboratory action will be to introduce either a liquid or gas chromatography mass spectrometry to analyze the leachate contaminate compounds.

Potential Impacts and VTrans Benefits

Plastic and their additives may contain compounds to cause adverse effects to the environment. Projecting with polymer modified roadways will change the active construction phase with their production facilities and paving equipment based on this limited testing. Polymer modified asphalt binders may serve as an additive to the roadway network with Vermont's climate, without significant environmental impact. Extending the experimental duration will be more reliable for a conclusive recommendation.